

CHILDREN'S SCHEMATIC REPRESENTATIONS OF AILMENTS

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RESUMEN

En éste trabajo se han obtenido categorizaciones de semejanza y diferencias entre distintos tipos de enfermedades y condiciones físicas en 24 sujetos de 8 años de edad y 20 de 11 años. A cada sujeto se le presentaba una secuencia de 10 combinaciones de 3 enfermedades de un conjunto de 5 y tenían que identificar dentro de cada tríada los dos que fueran más semejantes uno a otro y diferentes del tercero; después los sujetos daban las razones para su elección. Se utilizaron dos conjuntos paralelos de 5 enfermedades, seleccionadas de tal modo que representaran las mismas categorías convencionales. Los resultados indicaron un consenso significativo dentro y entre los grupos de edad en juicios de la semejanza relativa de las diferentes categorías de enfermedades entre sí. Este patrón de juicios permaneció estable en los dos conjuntos paralelos. Los niños con más edad fueron capaces de verbalizar más razones para sus juicios. Estas razones revelaron una diversidad de criterios, entre los cuales no predominaron los antecedentes causales, aunque los niños mayores los mencionaron más frecuentemente. Se entiende que los resultados apoyan una perspectiva que incorpora esquemas cognitivos, que implica continuidad más que discontinuidad en el desarrollo cognitivo.

Palabras clave: Enfermedad, esquemas, desarrollo cognitivo.

ABSTRACT

Categorizations of similarity and dissimilarity between different types of illnesses and physical conditions were obtained from 24 8-year-olds and 20 11-year-olds. Subjects were each presented with a sequence of ten combinations of three ailments from a set of five and had to identify the two within each triad that were most similar to each other and different from the third; they then provided (open-ended) reasons for their choice. Two parallel sets of five ailments were used, selected so as to represent the same conventional categories. Results indicated significant consensus within and across age-groups in judgements of the relative similarity of different categories of ailments to each other. This pattern of judgements remained stable across the two parallel sets. Older children were able to verbalize more reasons for their judgements. These reasons revealed a variety of criteria, among which causal antecedents, although more frequently mentioned by older children, did not predominate. These findings are interpreted as supporting a cognitive schema approach, implying continuity rather than discontinuity in cognitive development.

Key words: illness, schemata, cognitive development

INTRODUCTION

Children's understanding of health and illness has been the focus of a considerable body of research, largely because of the implications for communication with those undergoing hospitalization or suffering from chronic disease, (Bibace & Walsh 1981, Eiser & Eiser 1987) and development of primary prevention programmes (Altman & Revenson 1985). It is perhaps unfortunate that so much of the work has been embedded in a "stage" model of cognitive development resulting in the conclusion that explanations of illness need to be targeted at a specific level. The belief that children's understanding of illness progress through a series of rigid stages takes no account of social factors or environmental influences. A number of studies have challenged the idea that children's beliefs about illness are stage dependent, and further suggest that understanding may be more sophisticated than previously thought (Carey 1985; Eiser, Eiser & Jones 1990; Eiser, Eiser & Lang 1989; Siegal, Patty & Eiser 1990).

This approach is therefore subject to increasing criticism (Eiser 1989). Theoretically, there is no account of the processes whereby children shift from

one stage to another, or attempt to handle *décalage* within any specific stage (Levin, 1986). At best, previous findings provide an adequate descriptive account of children's verbalizations, but there is no real reason to interpret such verbalizations as dependent on explanations involving changing logical structures, (Carey 1985).

Methodologically, too, the work has a number of shortcomings. The style of interviewing is often unnatural and repetitive, lacking many of the pleasantries of normal conversation (Siegal, Waters & Dinwiddy 1988). Non-standardized questionnaires and inadequate (or non-existent) control groups characterize other studies (Burbach & Peterson 1986). Poor reliabilities have been reported in attempts to code childrens' verbalizations in accordance with Piagetian theory (Bird & Podmore 1990). Finally, with few exceptions, research has focused on the child's understanding of the **cause** of illnesses. Such an emphasis is particularly inappropriate when the illness in question (such as cancer, asthma, or many other chronic conditions) do not have single, or even readily identifiable causes.

It is therefore essential that children's understanding of illness is not limited to that of causal explanation, but that other dimensions which might characterize beliefs are also considered. For example, in a study by Altman and Revenson (1985) involving children aged between 8 and 14 years, a factor analysis identified general worries about health and beliefs about susceptibility to illness as distinct from more 'causal' beliefs concerning health locus of control. Altman and Revenson argue that the emphasis in previous work on illness causation may limit its implications for aspects of health promotion.

All this suggests that children may be organizing their knowledge of health and illness on the basis of a variety of criteria, not all of which are explicitly causal. It is therefore appropriate to look at children's schemata and not merely at their attributions. As defined by Crocker, Fiske and Taylor (1984, p. 197)

"A schema is an abstract or generic structure, stored in memory, that specifies the defining features and relevant attributes of some stimulus domain, and the interrelationships among those attributes".

The concept of schemata is thus very similar to that of categories, in that it is assumed that individuals will categorize objects and events on the basis of particular kinds of similarities and differences. Furthermore, since a schema is a

representation of knowledge stored in memory in a generic form (rather than simply a derivation from an isolated set of experimentally presented stimuli), it is likely to be used relatively consistently across time and across contexts. In other words, it is a representation of **generalizable** knowledge in terms of which new experience will, as far as possible, be interpreted and assimilated. Increased experience can lead to elaboration of particular schemata so as to take account of more subtle distinctions and associations. Such elaboration will often be age-dependent, but not need not always be so. Quite young children can have extremely sophisticated schematic representations of particular topics in which they have developed a special interest or enthusiasm (Chi & Koeske, 1983). However, without a sharp discontinuity in experience (that is, something that fundamentally challenges the structure of a person's knowledge or beliefs), such elaboration can be integrated hierarchically into the existing schemata or categories. This has important implications for cognitive development, in that it implies continuity rather than discontinuity in the patterns of thought used by children (and adults) of different ages. This emphasis on continuity is quite different from much of the literature concerned with children's concepts of health and illness, where the influence of Piagetian psychology has been strong. A weakness of this approach is that it is assumed that the representation of knowledge is dependent more on a general stage of cognitive development and less on specific learning experiences. Much is therefore made of otherwise arbitrary age-points which are presumed to mark the boundaries between, for example, concrete and formal operations.

Whatever the merits of such *stage* notions in other contexts, there is no consistent support for such distinctions with regard to children's concepts of health and illness (Eiser 1989). In fact, Carey (1985) presents convincing evidence that beliefs change throughout the age range of 4-10 years. It is not necessary to understand these changes in terms of qualitative differences in operational thinking, but they can be represented in terms of a shift from an essentially naive psychology of human behaviour to a biologically based theory of disease. This implies that much may be gained from comparisons of children of various ages, and not simply from studying those at transitions from supposedly different stages.

The present study therefore is an attempt to see if children from two age-groups will recognize a limited number of conventional distinctions between different illnesses or physical conditions, to the point that they can use these as a basis for consistent categorization, and whether the pattern of discrimination applies to different exemplars of the same categories. We also were interested in the reasons (if any) that children would offer for their discriminations, and

particularly whether these would refer predominantly to causal antecedents (justifying the bias of much previous work) or, as we anticipated, would include a variety of other criteria besides.

METHOD

Subjects

The sample consisted of 24 8-year-olds and 20 11-year-olds. Pilot work suggested that the task was difficult for some children below 8 years of age. The age-groups therefore represent a younger group functioning within a psychological theory of human behaviour and an older group just emerging with concepts of disease derived from more biologically based theories according to Carey (1985). There were equal numbers of boys and girls in each group. The children came from a broad cross-section of social backgrounds and were of mixed abilities. Parents were informed about the study by letter. No parent objected to their child taking part, and all children in school in the appropriate age-range on the day of testing were included.

Stimuli

There were two parallel sets of stimuli, each consisting of the names of five ailments. These ailments were selected to represent five categories: (a) childhood contagious condition, (b) minor symptoms, (c) common infections, (d) serious illness and (e) accidental injury. Thus, set A consisted of measles, head-ache, 'flu, heart-attack and burned hand; set B consisted of chicken-pox, tummy-ache, cold, cancer and broken leg. Each name was printed on a separate sheet of white card. Half the children in each group were shown examples from set A; the remainder from set B.

Procedure

Children were interviewed one at a time in the school music room. First they were asked if they had ever been in hospital and what it was like. (These data were not analysed but were used to encourage the children to talk freely about their experiences.) They were then told that they were going to play a kind of game, which they probably already knew, where they would be given the names

of three things and asked to describe how two were alike and different from the third. Two examples were given: a house, a tree and a school; and a tree, a violin and a piano. None of the children had any difficulty with the task. They were shown sets of three cards (each showing the name of an ailment), and asked to select the *"two that were most alike and different from the third"*. They were then asked to give a reason for their choice. Each child was asked to make ten responses so as to complete all possible combinations of three ailments from the set of five, with each illness appearing in six of the ten triads, with the ten triads presented in a random order. However, not all subjects were in fact able to make a selection on all triads; if they failed to respond after gentle encouragement, the triad in question was passed over and the next one presented. Finally, children were asked informally if they could think of the names of any other illnesses and how they had mainly learned about illness.

RESULTS

The first issue considered was whether subjects showed any consistency in their judgements of which ailments were more or less similar to each other, and if so, whether the pattern of similarity judgements was comparable for the two sets of stimuli and for the two age groups. To this end, we first counted the number of times each subject chose each of the five stimuli (ailments) as the 'odd one out' across the six triads in which it appeared. Thus, for each stimulus we derived a 'dissimilarity' score with a possible range from 0 to 6. Table 1 shows the means of these scores for the two sets and for the two age-groups.

These data were submitted to a repeated-measures MANOVA with two between-subjects factors (Set and Age) and one within-subjects factor (Ailment). This yielded a significant main effect for Set ($F(1,40) = 35.14, p < .001$), reflecting the fact that scores were generally lower for set A than set B. This result may therefore be interpreted as showing that the triads generated from set B were generally easier or more discriminable than set A in that they produced fewer non-responses. (Separate univariate comparisons indicated that the difference in dissimilarity scores was strongest in relation to the stimuli 'burned hand' and 'broken leg', ($F(1,40) = 4.85, p < .05$). The effects of Age and the Set x Age interaction were miniscule. The effect of Ailment, however, was highly significant ($F(4,37) = 16.07, p < .001$), showing that, across the two sets, the five types of ailment differed significantly in terms of dissimilarity from one another. Ailment did not interact with Set, Age or Set x Age ($F_s < 1$).

Table 1. Mean 'dissimilarity' scores for each ailment type as a function of Set and Age.

Ailment:*		a	b	c	d	e	N
Set:	Age:						
	8 years	1.31	0.92	1.15	2.46	2.08	13
	11 years	1.10	0.80	1.00	2.10	3.00	10
A	Combined	1.22	0.87	1.09	2.30	2.48	23
	8 years	1.46	1.00	1.09	2.64	3.73	11
	11 years	1.80	0.90	1.60	2.30	3.30	10
B	Combined	1.62	0.95	1.33	2.48	2.52	21
	8 years	1.38	0.96	1.13	2.54	2.83	24
	11 years	1.45	0.85	1.30	2.20	3.15	20
Combined	Combined	1.41	0.91	1.21	2.39	2.98	44

* Ailment types are (a) childhood contagious condition (b) minor symptoms (c) common infections (d) serious illness (e) accidental injury

Another way of considering these data is in terms of the rank order of the five types of ailment in terms of dissimilarity. This order, from least to most discriminable, was as follows: head-ache/tummy-ache, 'flu/cold, measles/chickenpox, heart-attack/cancer, burned hand/broken leg. For the total sample, Kendall's coefficient of concordance W was .32 ($\chi^2(4) = 56.24, p < .001$), indicating a high degree of inter-subject agreement in this rank ordering. The same ordering was shown for both sets considered separately (for Set A, $W = .31, p < .001$; Set B, $W = .34, p < .001$) indicating that subjects were discriminating consistently between categories of ailments. There was also high inter-subject agreement for both age groups considered separately (8 yrs, $W = .35, p < .001$; 11 yrs, $W = .30, p < .001$). Since the rank ordering was the same for both age-groups, this suggests that both younger and older subjects showed comparable recognition of such categories.

We next considered the reasons given by subjects for their choices. The following coding scheme was developed and yielded complete agreement between two coders, with a few ambiguities resolved by discussion:

- ° **No reason:** where a choice was made but no reason could be stated.
- ° **Incidence:** criteria concerning who might suffer from the ailment, how rare or predictable it was.
- ° **Cause:** causal antecedents of the ailment, such as own behaviour,

- accident or infection.
- ° **Feelings:** affective consequences such as pain or worry.
- ° **Symptoms:** parts of the body affected, possible co-occurrence of ailments.
- ° **Treatment:** how, if at all, the ailments would be treated, such as by going to hospital, staying home from school.
- ° **Effects:** general distinctions in terms of seriousness, such as likelihood of death or recovery, and physical consequences such as scars.

The mean frequencies with which subjects responded within any of these categories (as a function of set and age) are shown in Table 2. These figures combine the data across all triads presented; if more than one category of reason was offered for any one triad, both responses were included in the frequencies, but a single category could only be counted once for a single triad.

Table 2. Mean frequencies of different reasons, as a function of Set and Age

		Reason*:	No	a	b	c	d	e	f	Total
Set:	Age:									
A	8 years		1.69	0.23	0.69	1.39	2.15	1.92	2.00	8.39
	11 years		2.50	0.20	1.70	1.60	3.30	0.90	2.10	9.80
	Combined		2.04	0.22	1.13	1.48	2.65	1.48	2.04	9.00
B	8 years		2.91	0.00	0.55	0.36	2.55	1.36	2.36	7.18
	11 years		0.30	0.60	2.40	0.90	3.70	1.10	1.90	10.60
	Combined		1.67	0.29	1.43	0.62	3.10	1.24	2.14	8.81
Combined	8 years		2.25	0.13	0.63	0.92	2.33	1.67	2.17	7.83
	11 years		1.40	0.40	2.05	1.25	3.50	1.00	2.00	10.20
	Combined		1.86	0.25	1.27	1.07	2.86	1.36	2.09	8.91

* Reason are (a) incidence (b) cause (c) feelings (d) symptoms (e) treatment (f) effects

These data (with the exclusion of the 'no reason' frequencies) were submitted to a repeated measures MANOVA, with Set, Age and Reason (the six categories from 'incidence' to 'effects') as factors. This yielded a significant Age effect ($F(1,40) = 8.92, p < .005$), reflecting the fact that younger subjects gave fewer reasons when all categories were combined (means 7.83 vs. 10.20). Univariate tests indicated that older subjects were more likely to use 'cause' than younger subjects ($F(1,40) = 4.90, p < .05$), but age differences in the use of ot-

her categories, treated separately, were not significant. There was a strong main effect for Reason ($F(5,36) = 23.58, p < .001$), but no other main effect or interaction approached significance. Importantly, the Age \times Reason interaction yielded an $F(5,36)$ of only 1.14 ($p = .36$), indicating little difference between the age groups in the relative frequency of use of different kinds of reason. The differences in frequencies of 'no reason' responses (separately analysed) suggest a Set \times Age interaction, but this was not significant ($F(1,40) = 2.17, ns.$). Another way of looking at these data is to ask whether the rank order of frequency of mention of different types of reason was consistent across subjects. As may be seen in Table 3, there was significant agreement between subjects overall and within each set and age group separately, but the order of mean ranks was not identical across the different groups.

Table 3. Mean ranked frequency of mention of different reasons

	Inci- dence	Cause	Feelings	Symp- toms	Treat- ment	Effects	Kendall's W
Set A	2.46	3.28	3.85	4.11	3.43	3.87	.14**
Set B	2.62	3.71	3.21	4.36	3.26	3.83	.14*
8 years	2.58	3.33	3.67	4.02	3.40	4.00	.12*
11 years	2.47	3.67	3.40	4.47	3.30	3.67	.15**
Total Sample	2.53	3.49	3.55	4.23	3.35	3.85	.13***

Higher ranks represent more frequent mention * $p < .05$ ** $p < .01$ *** $p < .001$

Answers to the subsidiary questions on knowledge of different illnesses were not submitted to statistical analysis. Most children named between two and five additional illnesses. Although there was a bias at both ages towards the mention of childhood infections, a considerable variety of conditions was identified (one 11-year-old girl named three equine diseases!). At both ages, children mentioned their mother and television as their main sources of knowledge about illness.

DISCUSSION

These findings imply a reliable degree of consensus among our subjects in their conceptions of the relative similarities and dissimilarities between diffe-

rent illnesses or physical conditions. The close parallel between the findings for the two stimulus sets suggest that these conceptions are based on judged relationships between categories, and are less dependent on the particular exemplars of the categories presented. These category relationships were judged in essentially the same way by our younger as by our older subjects, implying that, if there are developmental changes within this age-range in children's conceptions of illness, such changes are not a matter of increased recognition or discrimination of categories at this level of complexity. Nonetheless, it should be remembered that each subject only received one exemplar of each category. We cannot be sure that the same relationships would have emerged from judgments of the two age-groups if several exemplars had been presented.

Much previous work (Bibace & Walsh, 1981) has postulated major qualitative shifts in children's **explanations** of illness and has defined conceptions of health and illness almost entirely in terms of such explanations. Our data indicate that older subjects were more fluent in terms of the number of reasons they offered generally and in terms of the number of 'causal' explanations in particular (although it must be remembered that the Age x Reason interaction was nonsignificant). In other words, although the younger subjects made essentially the same discriminations between the illnesses as did the older subjects, they were rather less able to verbalize the reasons for their choice. On the one hand, this implies that older children may have developed more complex linguistic representations of particular category systems (without necessarily restructuring the category system *per se*). On the other hand, it might be inferred that methods of assessment that rely heavily on linguistic response modes may underestimate the discrimination abilities of younger children.

Our data also warn against an emphasis on specifically causal explanations, as opposed to other criteria for discrimination. In broad terms, our subjects were more inclined to categorize the different illnesses in terms of symptoms and consequences than in terms of antecedents. This is reminiscent of debates in the field of social cognition, where it is becoming increasingly accepted that a predominant reliance on models of causal attribution (explanation) may fail to account either for how individuals **predict** their environment, or for how such predictions shape behaviour (Eiser, 1986; Holland et al., 1986). Very simply, it may be just as important to know what will happen if you have an illness as to know why that illness has occurred.

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